

## ABSTRACT OF THE DISCLOSURE

An optical amplifier including : an erbium-doped amplifier  
5 medium , a first excitation generator and a second excitation generator. The  
first excitation generator is adopted to cause a first type excitation of the at  
least one kind of rare-earth ions to cause a population inversion between  
the laser upper level and the laser lower level. The second excitation  
generator is adopted to cause a second type excitation of the at least one  
10 kind of rare-earth ions from the excited state absorption lower level to a  
high excited level which is equal to or higher than the laser upper level.